

Claims

1. A process of preparing an elastic thermally bonded nonwoven web, whereby the process is characterized by the following steps:
 - (i) providing a thermally bonded nonwoven precursor web containing thermoplastic fibers,
 - (ii) subjecting the precursor web of step (i) to a drawing treatment in a machine direction at a drawing rate of from 45 to 70 %, and a strain rate within a range of from 1000 to 2400 %/min at a temperature between the softening point and the melting point of the fibers for preparing the elastic thermally bonded nonwoven web.
2. The process according to claim 1, wherein the processing speed is at least 100 m/min, preferably in a range of from 200 to 400 m/min.
3. The process according to claim 1, wherein the drawing treatment in step (i) comprises introducing the thermally bonded nonwoven precursor web into a heating means for heating the web to a temperature between the softening point and the melting point of the fibers.
4. The process according to claim 1, which further comprises the step of cooling the web after the drawing treatment.
5. The process according to claim 1, wherein the precursor web contains polypropylene fibers.
6. The process according to claim 5, wherein the polypropylene fibers are contained in an amount of at least 30% by weight.
7. The process according to claim 1, wherein the precursor web contains cellulosic fibers.
8. The process according to claim 1, wherein the precursor web consists of polypropylene fibers.
9. The process according to claim 1, wherein the elastic nonwoven web has anisotropic elasticity properties.

10. The process of claim 9, wherein the ratio of elongation at break in machine cross direction to the elongation at break in machine direction is at least 800%.
11. The process according to claim 1, wherein said nonwoven precursor web is a spunbonded web.
12. The process according to claim 1, wherein nonwoven precursor web is a melt blown web.
13. The process according to claim 1, wherein said nonwoven precursor web is a carded thermally bonded nonwoven web.
14. The process according to claim 1, wherein said nonwoven web is a laminate containing two or more of the nonwoven webs according to any one of claims 11 o 13, or a laminate of the nonwoven webs according to any one of claims 11 o 13 and a thermoplastic film.
15. The process according to claim 1, wherein said thermally bonded nonwoven web is a blend of thermoplastic fibers and cellulosic fibers wherein said web contains at least 30% thermoplastic fibers.
16. The process according to claim 1, wherein the the process is carried out continuously.
17. The continuous process according to claim 16, wherein the drawing treatment in step (i) comprises unwinding the thermally bonded nonwoven web into a first variable tension means which feeds said web into a web heating means for heating the web to a temperature between the softening point and the melting point of the fibers, followed by continuously stretching the heated web lengthwise in the machine direction, cooling the web and collecting the cooled web.
18. A thermo-mechanical method for treating a nonwoven web according to any one of the previous claims, which comprises:
 - a. providing a thermally bonded polypropylene nonwoven web of carded, spunbond, SMS and SMMS as precursor web;
 - b. provide an unwinder roll and the winding roll in a distance of 6-10 meters.
 - c. continuously feeding the precursor web from the unwinder roll to the winding roll at a speed in a range of from 150m/min to 400m/min;
 - d. heating the precursor web at a temperature between the softening temperature

- and melting temperature of the thermoplastic polypropylene;
 - e. drawing the heated web by increasing the speed of winding roll over the unwinder at least 45% and to 70%, to thereby reduce the width of the web by 50% to 65 % whereby the
 - f. strain rates are within the range of 1000% to 2400% /min.
19. The process according to claim 18, wherein the unwinding roll is a pair of pin-rolls to make a S-wrap for creating the draw ratio and release the finished web to the winder.
20. The process according to claim 18, wherein the precursor web is a single layer or multiple layers construction that are thermally bonded or laminated.
21. A elastic thermally bonded nonwoven web containing polypropylene fibers obtained or obtainable by the process of any one of claims 1 to 20.
22. An elastic thermally bonded nonwoven web which has an elasticity in the cross direction of
- at least 70% recovery from a 100% elongation, and
 - at least 60% recovery from a 150% elongation.
23. An elastic nonwoven web in particular according to claim 21, made from a nonwoven precursor of carded, spunbond, SMS, and SMMS comprising polypropylene thermoplastic fibers and being heated and drawn in longitudinal direction over a 6-10 meters distance at speed range of 150m/min to 400m/min to reduce 50% to 65 % the width of its precursor, wherein the drawing is made by feeding the web through a heating device installed between the unwinding and winding rolls to heat up the web in the temperature between the softening temperature and melting temperature of the thermoplastic fibers and by spontaneously increasing the speed of winding roll over unwinder at least 45% to maintain the strain rate in the range of 1000% to 2400% per minute, whereby the elastic nonwoven web is characterized by the elasticity of at least 70% recovery from a 100% elongation, or 60% recovery from a 150% elongation, in the cross direction.
24. The elastic nonwoven web of claim 23 wherein the precursor web is composed of co-filament fibers, or the mix of mono and co-filaments.
25. The elastic nonwoven web of claim 23 wherein the core of the co-filaments is composed of different thermoplastics of sheath.

26. An elastic laminate comprising:
 - (a) the elastic nonwoven web of claim 21; and
 - (b) a stretchable substrate bonded to the elastic nonwoven web.
27. The elastic nonwoven laminate of claim 26 wherein the substrate is an elastomeric layer.
28. The elastic nonwoven web of claim 26 or 27 wherein the substrate is a film.
29. Use of the elastic nonwoven web according to any one of claims 21 to 28 for the preparation of a disposable sanitary protection product, a medical product, a protective work-wear or a personal use item.
30. The use according to claim 29, wherein the disposable product is an adult or infant diaper, or a sanitary napkin.
31. The use according to claim 29, wherein the medical product is a mask, an operating gown, a head cover, or an operating drape.
32. The use according to claim 29, wherein the protective work-wear is a coverall, a head cover or mask.
33. The use according to claim 29, wherein the personal use item is underwear.
34. Product containing an elastic nonwoven web according to any one of claims 21 to 28.
35. The product according claim 34, which is a disposable sanitary protection product, a medical product, a protective work-wear or and a personal use item.
36. The product according claim 35, wherein the disposable product is an adult or infant diaper, or a sanitary napkin.
37. The product according claim 35, wherein the medical product is a mask, an operating gown, a head cover, or an operating drape.
38. The product according claim 35, wherein the protective work-wear is a coverall, a head cover or mask.

39. The product according claim 35, wherein the personal use item is underwear.